SOCIAL DISTANCING AND MONITORING SYSTEM TO DETECT, CONTROL AND TO MONITOR THE PATIENTS USING ARDUINO & IOT.

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ABSTRACT:

Due to covid-19 pandemic situation society needs to embrace and adopt new norm that includes practicing social distance to break the transmission of the disease. The smart social distance device will help to break the transmission and the human chain to prevent the transmission of the deadly diseases. The smart social application or tracker can help people to constantly monitored reminded to adhere to this practice. Direct impact that can be seen from this application will be lower or minimum number of COVID-19 cases due to high level of social distance compliance. This paper will be present an innovative solution called social distancing and monitoring device that help users or public to observe social distance advice closely. On March 11, 2020, the World Health Organization (WHO) confirmed COVID-19 a pandemic, in response to the more than 1,00,000 confirmed cases globally in more than 100 countries, and the persistent threat of spreading furthermore by number of waves. Presently, there is no medicine to cure but now there is vaccine to prevent the spread of COVID 19. Even though there is more cases among the world due to the spreading of this deadly disease caused due to not maintain social distance. Here in this paper, we supposed to give solution for the cases increases because of not maintaining social distance between the humans and non-pharmaceutical prevention that we can easily adopt the practising of social distance. Social distancing i.e., maintaining a minimum distance of 1-1.5 meter between two individuals is one of the proactive measures advised by WHO. In this paper, we are implemented the sensors and microcontroller board with necessary techniques that helpful for preventing the deadly diseases like covid (corona virus), H1N1, Flu and many mo0re air borne diseases.

I.INTRODUCTION:

In March 2020, WHO has declared pandemic due to COVID-19. To date, it has been reported more than 10 million confirmed cases worldwide with more than 500,000 deaths reported. In the presence of contagious diseases such as H1N1 and COVID-19, social distancing is an effective non-pharmaceutical approach which plays an important role in managing pandemic from getting worse. If implemented properly, social distancing can effectively reduce the transmission and severity of a disease, hence reducing the pressure on healthcare systems and allowing more time for government countermeasures. In addition, the analysis suggests that social distancing initiatives and policies in response to the COVID-19 epidemic have substantial economic benefits. Many technologies have been deemed to be able to help people or authority to follow and

comply to the social distance rules and regulation. For example, wireless positioning systems can effectively remind people to keep a safe distance by measuring the distances between people and notifying them if they are too close to each other. Furthermore, other technologies such as Artificial Intelligence (AI) technologies can also be used to facilitate or even enforce social distancing. By leveraging latest wireless technology in a form of mobile devices such as smartphones, tablet and notebook we can develop a smart application that is capable to notify or alarm people automatically whenever the social distance minimum requirement is not adhered. In a public environment such as in the university that have many facilities where people convene in a classroom, lecture hall, offices and food court, the requirement to comply to the social distance will be higher and more important. But those techniques were very expensive and not affordable and portable by considering the public or government economic strategy we have to provide them with cost friendly devices that can easily accessible where we want to implement this. Through this smart device and smart application. This can ease the pressure to the management or building owners in terms of their responsibility to create awareness to the students, staff and visitor of the importance maintaining the social distance in campus. In addition, to avoid from being constantly notified the breach of social distance requirement, the app will have a feature where user can set the place where social distance tracker can be automatically disable when the person is at home for example. The application can also be tied up to colour code zone information in real time that can set the level of urgency to comply with the social distance requirement. A coronavirus is a type of common virus that infects our upper respiratory tract system including throat and nose. It derives its name from its crown like shape when observed under a microscope. As per World Health Organization (WHO), a pneumonia of unknown cause detected in Wuhan, China was first reported to the WHO Country Office in China on 31st December 2019. The outbreak was declared a Public Health Emergency of International Concern on 30th January 2020. On 11th February 2020, WHO announced a name for the new coronavirus disease: COVID-19. The situation was monitored closely along with daily assessment of the number of confirmed cases of COVID-19 across the globe. On March 11, 2020, as per WHO report, in the past two weeks, the number of cases of COVID-19 outside China had increased 13-fold, and the number of affected countries tripled. With more than 1,18,000 cases in 114 countries, and 4,291 people having lost their lives, COVID-19 was spreading alarmingly. In the ensuing days and weeks ahead, it was feared that the number of cases, the number of deaths, and the number of affected countries would increase further. Consequently, WHO characterized COVID-19 as a pandemic. It spreads through the novel Corona Virus. The microscopic image of Coronavirus is shown in Figure 1.
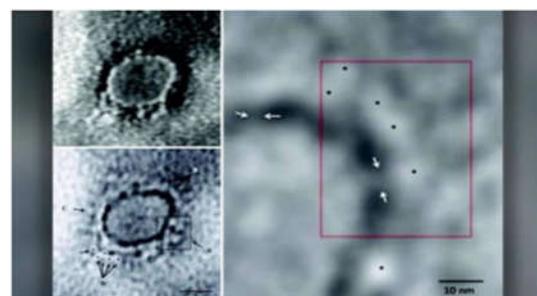

Figure 1: Microscopic Image of Corona Virus (Source:

II. EXISTING SYSTEM

The existing system focusing on monitor the patient health Sensors like heartbeat sensor, temperature sensor are

interfaced with the microcontroller (ARDUINO). In the event that the parameters of the patient vary abnormally, Alarm is activated. All the parameter data of the patient are visualized by using LCD display.

DRAWBACKS

- They are monitoring few parameters of patient health. In case of emergency, it will not detect.
- In case of the signal issues the alert not received by doctor on time
- The number of people infected with this deadly disease is increasing in India also. In line with the directions and guidance of the

GRAPH FOR EXISTING SYSTEM,
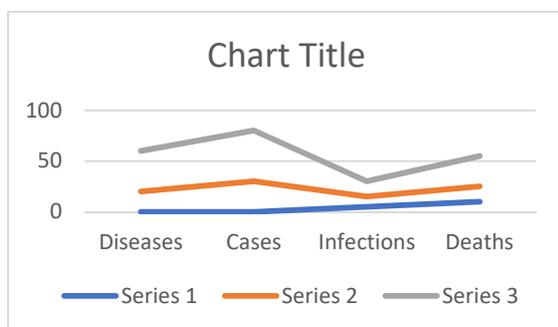
World Health Organization, the Government of India, has taken active steps with an aim to curb the spread of this disease. As per advisory issued the suspected patient should look for the following signs and symptoms:
- Fever

- Cough

- Shortness of breath or difficulty in breathing Presently there is no medicine to cure or vaccine to prevent COVID-19. As

they say prevention is better than cure, is aptly suitable in the current scenario. The best way to prevent infection is to avoid being exposed to the virus through the following measures: I. Observe good personal Hygiene II. Practice frequent hand washing with soap III. Covering mouth when coughing and sneezing IV. Social Distancing As per Health Experts Social Distancing can be an effective measure to curtail the spread of COVID-19. Social distancing is purposely maintaining the physical space between individuals to prevent spread of illness. Keeping a distance of at least one metre from other people lessens the chances of getting infected with COVID-19. Social distancing is a non-pharmaceutical infection prevention and control intervention implemented to avoid/decrease contact between those who are infected with a disease-causing pathogen and those who are not, so as to stop or slow down the rate and extent of disease transmission in a community. This eventually leads to decrease in spread, morbidity and mortality due to the disease. In addition to the proposed interventions, the State/UT Governments may prescribe such other measures as they consider necessary. For effective impact of social distancing the authorities have also taken the following measures

- Work from home

- Closing of Educational Institutions and Coaching centres and shifting to online mode

- Keeping in touch with near and dear ones using audio and video calls

- Annulling or deferring meetings, seminars, and conferences. There may be instances where movement or travelling of people is necessary to provide essential services like food, medicine, hospitals,

banks etc. Social distancing in such scenario can be observed in the following manner:

• Keeping a distance of at least 1-1.5 metre between individuals

• Greet people with Namaste instead of handshakes

• Usage of electronic money instead of currency

• Avoid public transport

• Maintaining a distance of at least 1-1.5 metre while standing in a queue for shopping The individuals who are staying at home should take the following precautions:

III. RELATED WORKS

Due to the importance of adopting social distance among people to contain the COVID-19 from continuously spreading, some initiatives have been introduced to implement and enforce it. Besides enforcement from authority to ensure people are complying to social distance rules, adopting latest technology such as internet of things (IOT) to increase the level of social distance compliance has also been considered. An Internet of Medical Things (IoMT) enabled wearable called Easy Band was introduced by Tripathy et. al. [6] to limit the growth of new positive cases by auto contact tracing and by encouraging essential social distancing Advancement of hardware and software especially smart phones with built-in GPS, Bluetooth, LTE and Wi-Fi transceiver, faster CPU and real-time OS such as Android and IOS have given the opportunity for latest mobile application to be developed. For an application such as social distance monitoring system, important modules to enable its main features are required. Module such as distance tracker, location

• Wash hands frequently with soap

• Request visitors to avoid coming home

• Avoid visiting markets and shops for buying essentials and prefer the home delivery option

• Frequently sanitize surfaces like doorknobs, taps, kitchen surfaces and other objects that are touched on a regular basis Technology can be effectively used for maintaining the requisite distance as per social distancing norms. The proposed system uses a wearable device capable of sensing the distance between two individuals and triggering an alarm in the event of proximity between the individuals

tracker and real time notification are necessary. To estimate the distance between users, a model that is based on wireless signal strength has been studied. Lam and She has proposed a distance estimation on Moving Object using received signal strength (RSS) of BLE beacon addition, BLE beacon also has been used by Takamatsu et. Al. in their social graph analysis study.

IV. SYSTEM ARCHITECTURE

The system architecture of social distancing kit can be seen in Fig. 1. social distancing application integrates a number of objects or modules such as Bluetooth Distance tracker, GPS module, Google Maps API and COVID-19 Zone indicator.

In general, social distance device will monitor the distance between users using signal.

Fig. 1: MySD System Architecture

IV. SYSTEM IMPLEMENTATION

droid platform. The following section will explain the implementation details of social distance. Social Distance Tracker and the leverages BLE signal to estimate the distance between people based on several advantages that BLE has as compared to Wi-Fi [5]. In general, the BLE signals have a higher sample rate than that of the Wi-Fi signals (i.e., 0.25 Hz 2 Hz), consumes less power than Wi-Fi technology, more signals availability since it can be obtained from most smart devices, whereas Wi-Fi signals can be obtained from only access points and finally BLE beacons are usually powered by battery, and thereby they are more flexible and easier to deploy than Wi-Fi. Though distance estimation Though distance estimation using BLE is possible using the RSSI, its value exhibits significant variation and is subject to factors such as:

• Multipath fading

• Phone placement on a person, e.g. in a hand, in a pocket, proximal or distal to a receiver

• Environmental factors such as surface textures, geometry, and physical layout

• Device-specific characteristics such as chipset, antenna layout, and OS configurations All these factors introduce random noise in estimating distance. SD kit determines the distance between two

Bluetooth transceivers using the distance model estimation as shown in Eq. 1.

$$d = A \times \left(\frac{r}{t}\right)^{B} + C \qquad (1)$$

V. PROPOSED SYSTEM

The wearable device consists of Ultrasonic Sensor, Buzzer, and a microcontroller. The Sensor will detect the distance between the wearer and other individual. The microcontroller is programmed to verify the desired distance and trigger the alarm accordingly. The block diagram of the proposed system is shown in Figure 2.
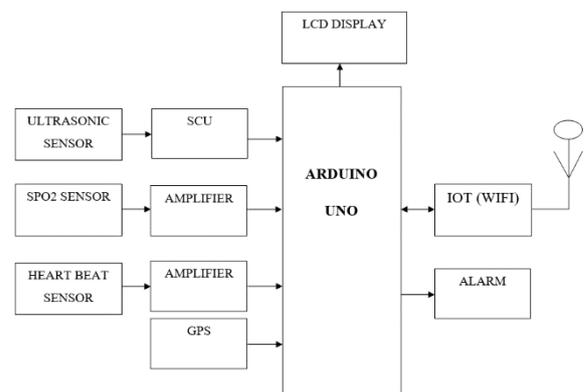
BLOCK DIAGRAM

The hardware components used are : (i) Battery (5v) – It supplies requisite power for operationalisation of the entire circuitry.

(ii) ATMEGA 328P microcontroller – It is a high performance, low power controller from Microchip. ATMEGA328P is an 8-bit microcontroller based on AVR RISC architecture. The Atmega328 has 28 pins. It has 14 digital I/O pins, of which 6 can be used as PWM outputs and 6 analog input (I/O) pins. These I/O pins account for 20

(GPIO) general purpose input output of the pins [4].

(iii) Buzzer - A buzzer is a tiny component to provide sound features to the system. It is a compact 2-pin polarized structure; hence can be easily used in various structures.

 (iv) HC-SR04 – The HC-SR04 Ultrasonic (US) sensor consists of 4 pins viz. Vcc, Trigger, Echo and Ground. This sensor is a widely used sensor in several circuits where measuring distance or sensing objects is required. The Sensor's operating frequency is 40Hz and operating current is less than 15mA. The component has a transmitter, which transmits an ultrasonic wave. This wave propagates in air and on being objected by any material, it gets reflected back towards the sensor and is received by the receiver. The circuit Diagram of the proposed system is shown in Figure 3.
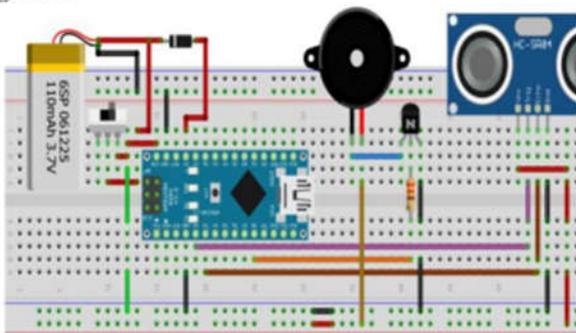

Figure 3: Circuit Diagram of the proposed Sys

VII. WORKING OF THE PROPOSED SYSTEM

During quarantine we need to maintain social distancing of at least 1-1.5 meter from the people and in public places. But sometimes human brain does not remember the precaution of maintaining social distancing. So, we have come up with a smart solution called Manav Raksha. It is a smart wearable device which can be used for maintaining social distancing from people. It contains an ultrasonic sensor, microcontroller, and a buzzer. HC-SR04 ultrasonic sensor (US) is used for measuring distance from body to object. And this measured signal by ultrasonic sensor is sent to the microcontroller. The program/ code is already uploaded in the microcontroller. The condition implemented in the code is that when the distance is greater than 1.5 meter the condition goes true and the electric buzzer starts blowing. And on other side if the distance is less than 1.5meter the other condition goes true and electric buzzer will not blow this time.

VI. SERIAL MONITORING

The conditions implemented in the program are as follows: 1- If the object/ wearer is at a distance of less than 1.5m from sensor the buzzer will start blowing till the sensor range is not greater than equal to 1.5m. 2- The other condition is that if the sensor is at a distance greater than 1.5m then this is safe distance as per the program and so the buzzer will not blow. Serial monitoring of the proposed system is shown in Figu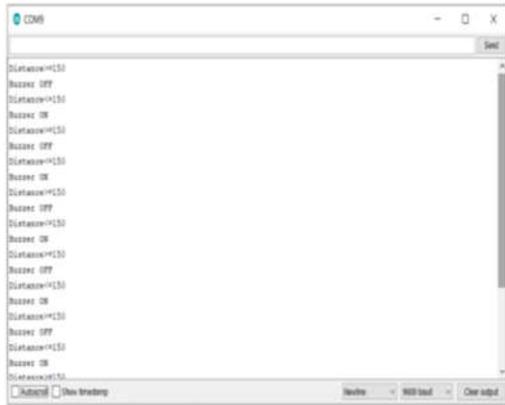re 5: Figure 5: Serial Monitoring of the proposed system V. RESULTS Humans Distance (cm) Buzzer Person1 >=150 OFF Person 2 <=150 ON Person 3 >=150 OFF Person 4 <=150 ON Person 5 >=150 OFF Person 6 <=150 ON Person 7 >=150 OFF If the distance is more than 150 cm the buzzer will remain OFF and if the distance becomes less than 150 cm the buzzer will be turned ON.

Figure 5: Serial Monitoring of the proposed system

V. RESULTS

Humans	Distance (cm)	Buzzer
Person1	>=150	OFF
Person 2	<=150	ON
Person 3	>=150	OFF
Person 4	<=150	ON
Person 5	>=150	OFF
Person 6	<=150	ON
Person 7	>=150	OFF

VI[I. RESULT
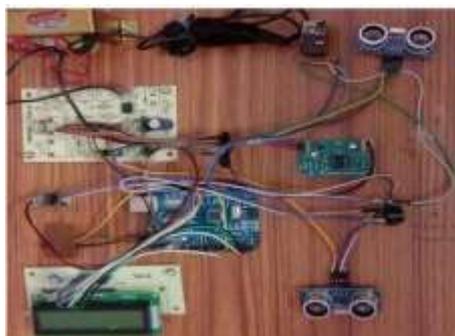
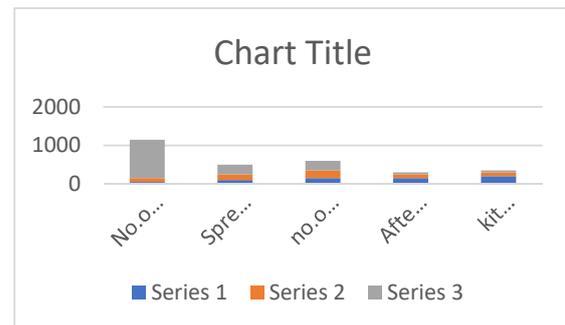Figure 6. - Experimenting set up for Social Distance monitoring system

ADVANTAGES

- Real-time monitoring
- Low cost
- Higher efficiency

APPLICATIONS

- Used in hospitals and home, everywhere we can monitor patient
- Less time to get a emergency alert.

CHART FOR RESULT,

IX. CONCLUSION

With government taking extreme steps to contain the spread of novel Coronavirus, it is our duty to follow the advice in letter and spirit. Technology can play a crucial role in facilitating social distancing, which is an effective way of preventing COVID 19. The system described in this paper uses the most commonly used components. A simple, but easy to wear device will help the community at large, in fighting against novel coronavirus.

In this way we designed a health monitoring system using IOT for higher accuracy to monitor patient at a time. Using this project doctor can monitor his patient everywhere in the world using IOT server and required treatment or medicine is prescribed. Everyone can use this project even patient attendant also monitor patient heart beat level, oxygen level, temperature level,

blood pressure level and flow heart beat using ECG Interface with the microcontroller. Even child having a heart problem for birth itself we can monitor heartbeat and in case of emergency immediately alert doctor using IOT. Every human life is important, health monitoring place a important role in this for that we are designed this project efficiently

X. FUTURE SCOPE

The machine is presently confined to test distance violation handiest withinside the targeted area. Future efforts can be targeted to extend the detection for the whole ground area, touch tracing. The machine may be prolonged without problems with minimum time and is fast adaptable to exclusive situation.

XI. REFERENCES

1. https://www.who.int.

Prasad et.al: "Transmission Electron Microscopy Imaging of SARS-CoV-2", DOI:10.4103/ijmr.IJMR_577_20

www.mohfw.gov.inhttps://components101.com. www.learningaboutelectronics.com

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1. Ebrahim Al Alkeem1, Dina Shehada1, Chan Yeob Yeun1,M. Jamal Zemerly „Jiankun Hu "New secure healthcare system using cloud of things", Springer Science+Business Media New York 2017

2. Yena Kim, SeungSeob Lee and SuKyoung Lee "Coexistence of ZigBee-based WBAN and Wi-Fi for Health Telemonitoring Systems"DOI 10.1109/JBHI.2014.2387867, IEEE Journal of Biomedical and Health Informatics

3. Mirza Mansoor Baig & Hamid Gholamhosseini "Smart Health Monitoring Systems: An Overview of Design and Modeling", Springer Science+Business Media New York 2013

4.S. M. Riazul islam, Daehan kwak, MD. Humaun kabir, Mahmud hossain, and Kyung-sup kwak," The Internet of Things for Health Care:A Comprehensive Survey" , DOI 10.1109/TDSC.2015.2406699, IEEE Transactions

5. Afef Mdhaffar, Tarak Chaari , Kaouthar Larbi, Mohamed Jmaiel and Bernd Freisleben "IoT-based Health Monitoring via LoRaWAN", IEEE EUROCON 2017.

6. Mohammad M. Masud, Mohamed Adel Serhani, and Alramzana Nujum Navaz "Resource-Aware MobileBased Health Monitoring", 2168-2194 (c) 2015 IEEE

7. Ayush Bansal , Sunil Kumar, Anurag Bajpai, Vijay N. Tiwari, Mithun Nayak, Shankar Venkatesan, Rangavittal Narayanan, "Remote health monitoring system for detecting cardiac disorders", IET Syst. Biol., 2015, Vol. 9, Iss. 6, pp. 309–314. 8. Hamid Al-Hamadi and Ing-Ray Chen, "Trust-Based Decision Making for Health IoT Systems" DOI

10.1109/JIOT.2017.2736446, IEEE Internet of Things Journal. 9. Muthuraman Thangaraj Pichaiah Punitha Ponmalar Subramanian Anuradha, "Internet Of Things (IOT) Enabled Smart Autonomous Hospital Management System – A Real World Health Care Use Case with the Technology Drivers", 2015 IEEE International Conference on Computational Intelligence and Computing Research.

10. Maradugu Anil Kumar, Y.Ravi Sekhar, "Android Based Health Care Monitoring System" IEEE Sponsored 2nd International Conference on Innovations in Information Embedded and Communication Systems ICIIECS'1.